

# VTECH Laser 310





My collection of a Laser 310


Reminiscent of antique 8-bit computer, I first think of is the Video Tech Laser of 310. Why not, just because he is in my life touch to the first computer.

The 80s, because of the small flat grandpa vision of the word--“computers to children”, I was the school schedule to learn the computer. At first day, the students all thought is Mathematical Olympiad courses, but it is Strange also to learn some perpetually, what if, what goto, we use the Chinese marked as“clothing”, the“dog of the rabbit”, and later came to know that this is the BASIC language. Go to the children's Palace on the time machine, the first saw the computer look like, Well, that rows of white, then a big-ass display, this Laser of the 310. My life is changed.

Vaguely remember when 3 kids shared a computer, and the children's Palace are also not equipped with a tape drive, a weekly home the program written on the paper, next to it is your turn on the time machine, the row of lines of code to knock to go in and see whether the results are correct. When can touch the machine has been very exciting, and if you are of the few sections of the code are correct, and that proud feeling like it was on the day the same, people will drift up. Later on the school, the school room where the computer was the Apple II and 8086, since then haven't seen the Laser 310 anymore.

#### Specifications

<b>Model</b>	LASER 310
<b>Manufacturer</b>	 Video Technology / Vtech
<b>Type</b>	Home

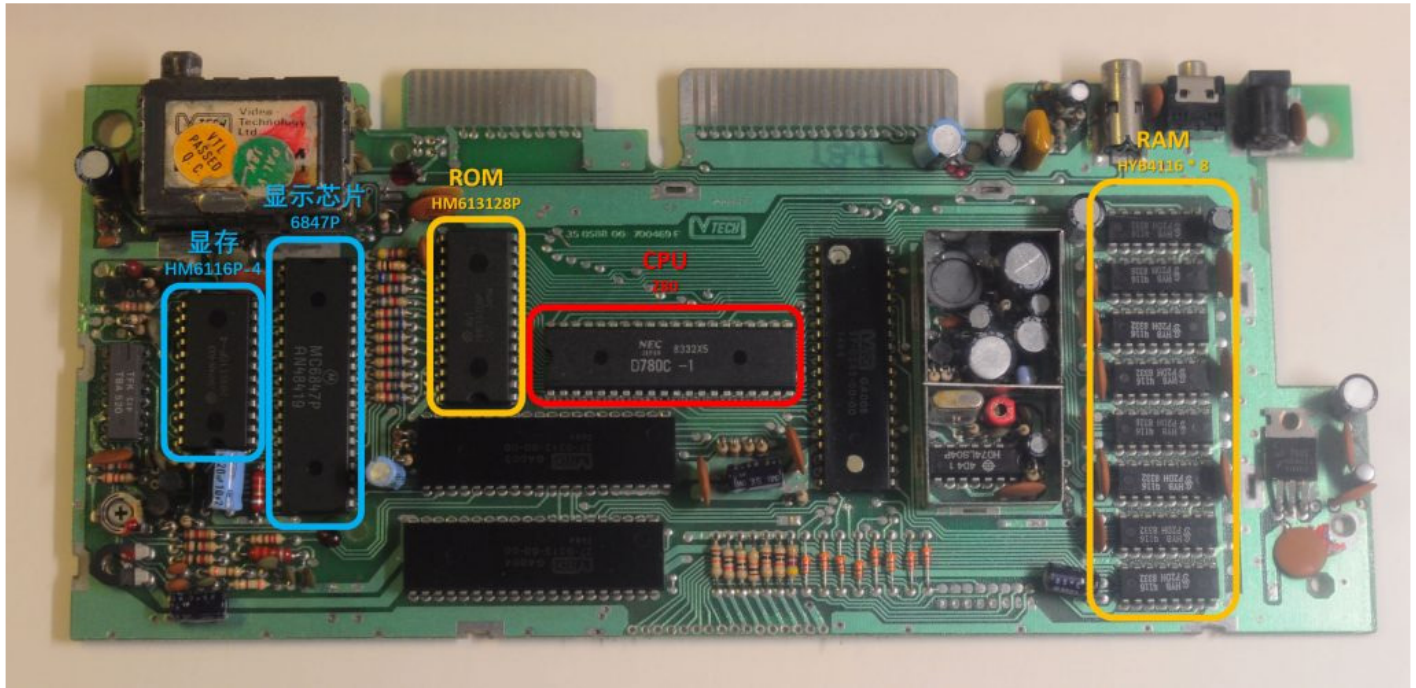
<b>Country of origin</b>	Hong Kong
<b>Listed Year</b>	1984
<b>Built-in languages</b>	Microsoft Basic 2.0
<b>Keyboard</b>	QWERTY, 46-key keyboard contains basic instructions and images symbols
<b>CPU</b>	Zilog Z80 A
<b>Main frequency</b>	3.54 MHz
<b>Coprocessor</b>	Display chip: Motorola 6847
<b>RAM</b>	16 KB (up to 64 KB)
<b>Memory</b>	2 KB
<b>ROM</b>	16 KB
<b>Text mode</b>	32 x 16, 8 colors (Mode 0)
<b>Graphics mode</b>	128 x 64, 4 Colors (Mode 1)
<b>Max number of colors</b>	8
<b>Sound</b>	Speaker, 1 Voice, 3 octaves
<b>Size/weight</b>	30.5 x 18.5 x 5.5 cm / 800g
<b>I/O port</b>	Tape (600 bauds) TV RF output of the A/V video output without audio, RCA Lotus terminal) memory expansion port the expansion port
<b>Power supply</b>	 1: GND 2: +9-12V 800MA DC
<b>Price</b>	\$199 tax Australia, 1985 7 months \$99 tax included Australia, 1985 12 months

For sale

The previous generation of the Laser 200 market success after Vtech (Vtech in 1984 launched a next-generation product Laser of 310. Laser 310 in the Laser 200 on the basis of the keyboard and the memory to do the upgrade. Laser 310 using the hard plastic of the physical buttons of the keyboard replacing the Laser 200 soft rubber chiclet keyboard, feel enhanced a lot, but in fact feel or residue?, the Soft, disassemble the keyboard, you will be able to find that in fact the key to the resilience relies entirely on the keycap rubber stretch, of course, compared to the Laser 200 soft rubber keyboard is better on a lot of it. While Laser 310 memory has also been upgraded, compared to the Laser 200 that pathetic 2KB of memory, the Laser 310 using the 8-2KB of RAM chips HYB4116 to the composition of the 16KB of memory, which was the mainstream of the market, taking into account both the price, and meets most of the requirements of the memory space. Due to the memory expansion port Pinout with the Laser 200 is consistent, so you can use the Laser 200 16KB memory expansion card that enables a host extended memory to 32KB, plus 2KB memory, in a promotional version of the RAM, the total number can reach 34KB。 In addition, there are rumors on the market there are rare factory pre-installed with an 8-8KB RAM chip HM4864P-2) a total of 64KB of memory versions exist. In addition to the keyboard and memory changes, the Laser 310 and the rest are and the Laser 200 is consistent. Therefore, in the software, the Laser 310 is fully downward compatible.

Laser 310 in Australia and New Zealand, by Dick Smith Electronics (DSE), the company responsible for the introduction and sales, in both regions the sales model for the VZ-300. In Australia, a listing of early(1985 7 on sale for\$199, and in the end, the price to\$99 sales in this six months period a period of time worked with a\$149 price sales.

## Hardware



The motherboard PCB layout

Laser 310 using Zilog's Z80A or other suppliers in the production under license production of the Z80A chip as the CPU, the main frequency runs in 3. 54Mhz。 Different batches of the use of the CPU may come from different manufacturers, I'm the hands of a few will have several sources, the figure this is the NEC, and Hitachi's.

Memory on the motherboard to the right position using the 8-HYB4116 (2KB chip to the composition of the 16KB of memory. As previously said, it is said there is also the use of 8-HM4864P (8KB) chip 64KB memory of the rare official version.

The ROM in the CPU on the right side, using a HM613128P chip, offers 16KB of space to store Microsoft BASIC, and so the ROM program.

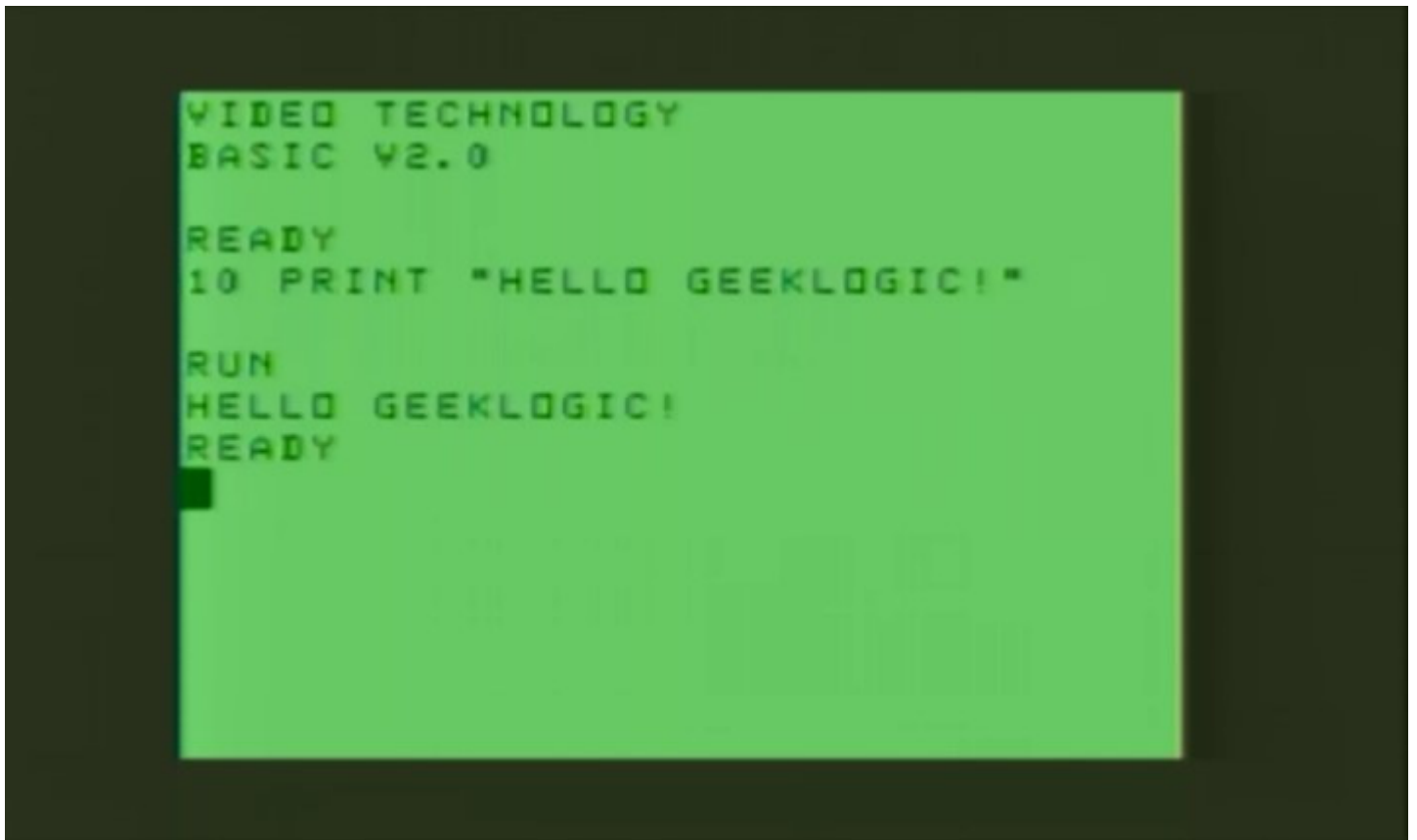
On the motherboard to the left of the display circuit. The top left of the shielding box is the RF modulator, the bottom of a Motorola 6847P responsible for the graphics display control. 6847P for Laser 310 provides a Mode 0 and Mode 1, two kinds of display mode. Mode 0 is 32\*16 text display mode, in this mode, you can display up to 8 colors; the Mode 1 is 128\*64“high resolution”graphics display mode, in this mode you can simultaneously display 4 colors. HM6116P significant presence display chip on the left side, the pitiful the only 2KB in the year or can it? in.

A few hit the VTECH subject of a custom chip is responsible for the CPU and display, and other peripherals, as well as the keyboard IO communication. The bottom of the sinking responsible for the speaker and the drive control.



On the motherboard the left-most is a 7805 chip, is responsible for the DC-DC buck to 5V, the host will be connected to a piece of aluminum cooling plate, the photo I have been demolished.

## Microsoft BASIC



Boot automatically run the Microsoft licensing Microsoft BASIC 2.0

And at the time many of the home computers of the same, the Laser 310 in the ROM comes with a Microsoft licensing Microsoft BASIC 2.0 interpreter, the system automatically after boot into the BASIC language of the interface, you can directly write a BASIC program. In fact, this BASIC system not only can write a BASIC program, or a tiny operating system can use the command to operate the tape drive, printer and other peripherals, through the tape to access the file run the game and other applications.

Microsoft Microsoft BASIC 2.0 and at the time of the TRS-80 BASIC is similar, however, and the TRS BASIC is not exactly the same as, for example, RANDOMIZE, ON and DEF, etc. instruction is not in the system. Therefore some of the TRS-80 on the use of simple procedures may need to rewrite it is possible in the Laser 310 run directly on, but there is a part of the program cannot be directly run. There are about 25 extensions to the BASIC instruction is not in the VTECH BASIC environment.

VTECH Microsoft BASIC 2.0 support integer and floating-point arithmetic, but the double-precision floating-point is not supported.

## My Laser 310

As she grew older, more and more nostalgic. I have always wanted to have a own Laser 310, but didn't know where to look. Suddenly one day, made the first idle fish on someone in the sale, a look at the price, the 800-\$ 1200, the cheaper is the point is not bright and Huaping. With a few boss chatted, the result is "this is the

price”, “I do not understand the operation, don't know, okay?”. Uh, well, you also don't know to buy to be not available. Squat honoring a period of time after the discovery, there have been two owner low price sale don't know the quality of the Laser 310. A \$ 80 the point is not bright even with the packing, the other is a \$ 65 price sale three Iraqi colour missing keys do not know quality of the machine. I instantly feel with my small potatoes electrician level, as long as this four-station anyway also can scrape out a complete good machine, if Minato not, that is the character issue. Apart from anything else, in order to grab up!

Goods in hand, with packaging that sets the aging yellowing of the powerful, in addition to three really is the Iraqi color Ah..... Vintage Old Gray plus a housing damaged..... Four stations are tried, no one can directly lit, a flower-screen, three is a black screen, could to turn the car.....



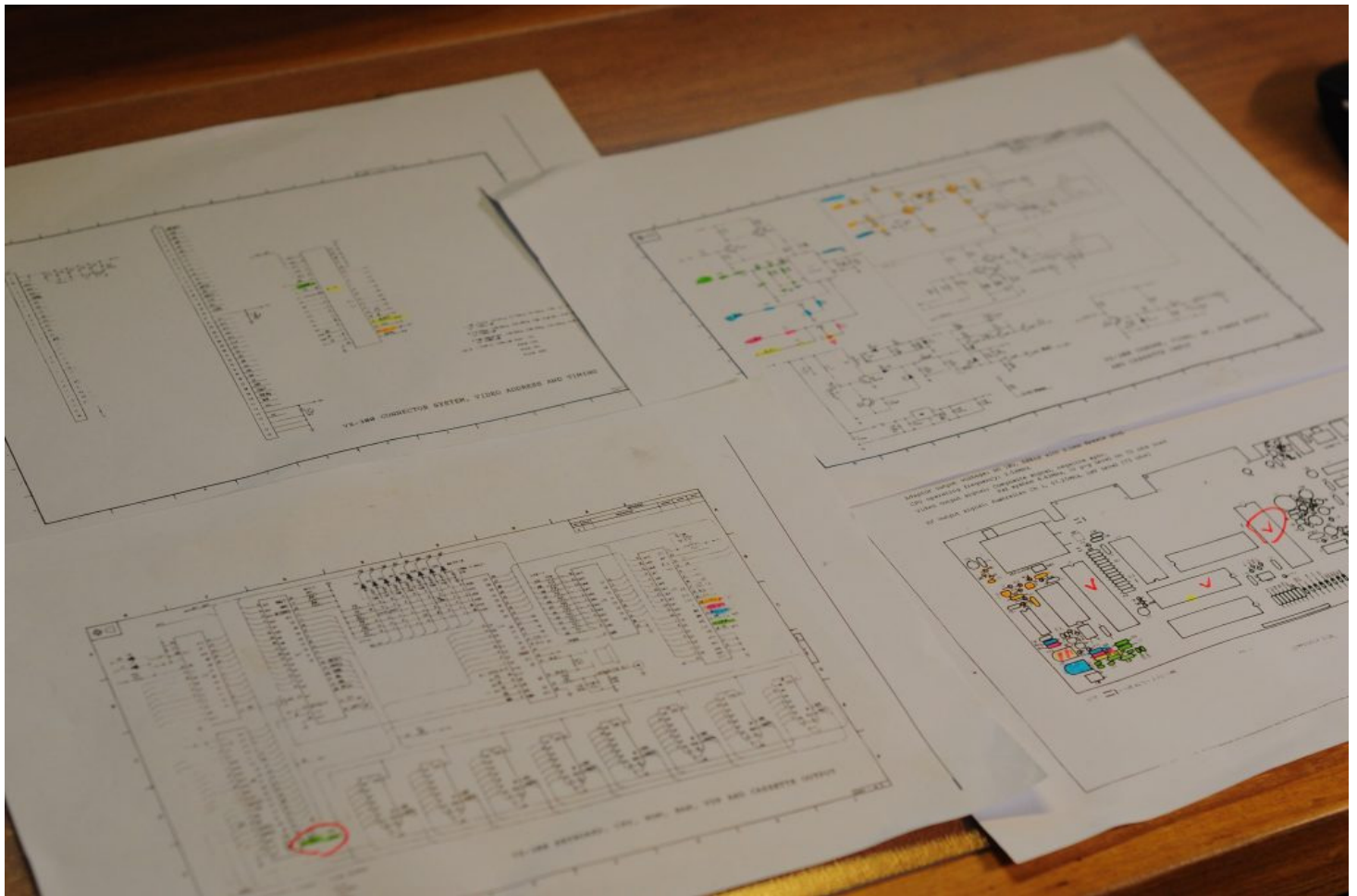
Iraq colour.....

With the box that the key is complete, I first split up and see what issues cause the point is not bright. A multimeter is a meal the operation, found that the 7805 on the no voltage, it's easy! Sure enough, this is estimated to save the poor, although there is the outer box, on the box there are water marks, estimated the

environment is relatively humid, resulting in the power interface to rust corrosion conductivity difference. Decisive changed one DC power port, power everything normal!

Iraq colour of the three, the housing damage that is boot to spend screen, and the other two can't light up, take a look at the housing good for it. One of the same 7805 there is no voltage, but the DC Jack is good, detected the switch contacts are oxidation is bad, remove the blade up, the switch the problem is solved but still the point is not bright. Then test found 7805 have a problem, okay this is commonly used chip is a stocking, a successful light!

Another black screen of the power supply section no problem, but in any event not lit, the first from the display circuit portion of the check from it. Online looking for the VZ-300 (Australian version of the Laser 310 technical manual, the inside circuit diagram to print out the study of the following ideas. Display The Associated control chip is a U15-Motorola 6847P, the U13, U10 is responsible for the CPU and memory and output to the demodulator chip VTECH custom chip, and the demodulated signal U17-TBA520. According to the circuit diagram, 6847 put RY, BY output to TBA520, while the U10 output PAL CLK to TBA520, the 6847 VDP signal to the to the U13, U13 Pin 21 output I Signal and TBA520 the output of the CHROMA together with the composite video signal. Turn to these key pins with an oscilloscope to check, find U10 Pin15 PAL CLK no output waveform.



A circuit diagram of a red circle have a problem

Could it be that the IC is broken? This chip or customized chip, the matter, the first from that Shell broken machine unsolder down, at least that machine on this chip is the output signal, the first change give it a try! 40pin DIP chip, the hot air gun blowing up half a day to finally remove the transfer on, the power-on



consequences of natural smooth light! So finally that the housing is bad also just do parts of the machine, do not repair, and final repaired three Laser of 310.

The next live is cleaning up! Put the three machines of the housing removed with a scrub brush and detergent desperately brush, can probably take a clean, some of the black stubborn stains after washing with nano sponge plus brush stainless steel pot with ceramic micro-particles, the cleaning milk a RUB on to become very clean. But aging yellowing of the problem have solved it. Online to find the next, found plastic to yellow agent, order to buy to try. Follow the instructions to find a Sunny auspicious to wear gloves, a napkin foam stickers at the top, with the plastic wrap is good, the sun 2-3 hours, and sure enough to successfully whitening! (□□Go to the yellow agent containing a high concentration of hydrogen peroxide, do not direct skin contact, otherwise the skin will be burns formed a large piece of white spots?)

Keyboard problem solved, open the keyboard, do a good cleaning, turn off the key to the shaft with the housing bad that in a good key to the shaft of the alternative, the three machines keycaps along the way, reluctant to fight two full keycap is missing a few, with the same size of other key caps instead of under it. Well, the rest, only the motherboard and keyboard two blocks PCB, anyway also point does not light up, buy a photo frame it up frame made into a souvenir for it.



Eventually, the four Laser 310 repaired three, and one made into photo frames. Perfect!



Three repair the Laser 310, also not do the whitening of the state, and just when Iraqi colour has been completely different.





There is a TV with original packaging, there is damp traces







## References

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- **Wiki.VZ200.org:** [http://wiki.vz200.org/index.php?title=The\\_VZ300](http://wiki.vz200.org/index.php?title=The_VZ300)
- **Bushy's VZ200 Website:** <http://www.vz200.org/bushy/>